

13 V/2 A PSU for handheld rigs

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This compact 13-V/2-A power supply for ham radio rigs and other VHF/UHF portable PMRs is based on the STR2012/13 voltage regulator IC from Sanken Electric Co. Many power supplies for handheld amateur radio rigs are based on the LM317, LM350 or even the good old LM723. Unfortunately, these regulators are

invariably associated with a fair number of external components, while we should also consider design factors like total power dissipation and input voltage range.

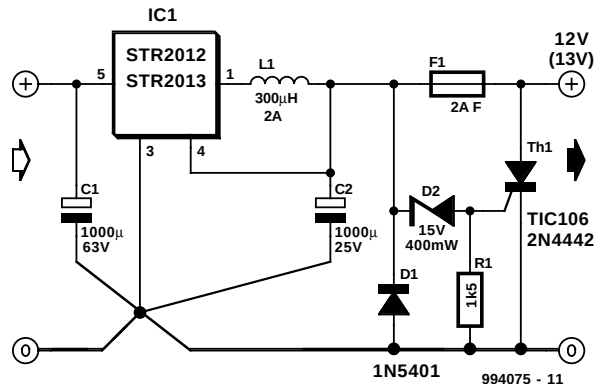
The STR is a hybrid power IC containing a switch-mode power supply. It supplies a fixed output voltage and accepts relatively high input voltages. Another advantage is its relatively high power dissipation rating. The 5-pin STR is available for 5.1 V, 12 V, 13 V,

15 V and 24 V at an output current rating of 2 A. Here, the STR2012 and STR2013 are suggested for output voltages of 12 V or 13 V respectively. The normal operating voltage of most hand-holds being between 12.6 V and 13.8 V, the STR1303 will be the preferred device in most cases.

A high-speed crowbar circuit is added to the regulator output. Thyristor Th1 (a TIC106 or 2N4442) is triggered when the output voltage rises above the zener voltage of D2, that is, 15 volts (approximately). When this happens, the thyristor short-circuits the supply output, protecting the radio against overvoltage and blowing fuse F1. Diode D1 acts as a reverse polarity protection, also in combination with fuse F1.

To allow for its dissipated heat, the STR regulator should be mounted on a heatsink. Efficiency will be around 80%, with ripple rejection at a comfortable 45 dB. The raw input voltage to the regulator should be in the range 18 to 35 V.

The coil, L1, may be selected from the range produced by Newport. The type 1430430 is suggested. If difficult to obtain, then an ordinary triac suppressor type may be used instead. Note, however, that the inductance of these coils is usually just $100\ \mu\text{H}$, so you have to count the number of turns and add another 0.7 times



that number to arrive at about $300\ \mu\text{H}$.

Finally, keep the wire between pin 3 of the STR and ground as short as possible, and connect at least the negative terminals of C1 and C3 to this point to give a 'star' type ground connection.